INCH-POUND

MIL-S-19500/614
10 January 1994

MILITARY SPECIFICATION

SEMICONDUCTOR DEVICE, FIELD EFFECT RADIATION HARDENED TRANSISTOR, N-CHANNEL, SILICON,
TYPES 2N7380 AND 2N7381
JANTXV M, D, R, F, G, AND H
JANS M, D, R, F, G, AND H

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for a N-channel, radiation hardened, enhancement mode, MOSFET, power transistor intended for use in high density power switching applications. Two levels of product assurance are provided for each device type as specified in MIL-S-19500, with avalanche energy ratings (E_{AS}) and maximum avalanche current (I_{AS}).

1.2 Physical dimensions. See figure 1 (TO-257AA).

1.3 Maximum ratings. Unless otherwise specified, T_C = +25°C.

Type	P_T 1/ T_C = +25°C	P_T 1/ T_A = +25°C (free air)	V_{GS}	I_{D1} 2/ T_C = +25°C	I_{D2} 2/ T_C = +100°C	T_J and T_{STG}
	W	W	V dc	A dc	A dc	°C
2N7380	50	2	±20	12.0	8.0	-55 to +150
2N7381	50	2	±20	8.0	5.0	-55 to +150

Type	I_S	I_{DM} 3/	Max $r_{DS(on)}$ 1/ V_{GS} = 12 V dc, $I_D = I_{D2}$		$R_{\theta JC}$ max	E_{AS}	I_{AS}
			T_J = +25°C	T_J = +150°C			
	A dc	A(pk)	ohms	ohms	°C/W	mJ	A dc
2N7380	12.0	48	0.18	0.33	2.5	150	12.0
2N7381	8.0	32	0.40	0.84	2.5	150	8.0

1/ Derated linearly by 0.4 W/°C for T_C > +25°C; $P_T = \dfrac{T_{Jmax} - T_C}{R_{\theta JC}}$

2/ $I_D = \sqrt{\dfrac{T_{Jmax} - T_C}{(R_{\theta JC}) \times (R_{DS_{on}} \text{ at } T_{Jmax})}}$

3/ I_{DM} = 4 x I_{D1}; I_{D1} as calculated by footnote 2/.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Defense Electronics Supply Center, ATTN: DESC-ECT, 1507 Wilmington Pike, Dayton, OH 45444-5270, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5961

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1.4 Primary electrical characteristics. Unless otherwise specified, T_C = +25°C.

Type	Min $V_{(BR)DSS}$ V_{GS} = 0 V I_D = 1.0 mA dc	$V_{GS(th)1}$ $V_{DS} \geq V_{GS}$ I_D = 0.25 mA dc		I_{DSS} max V_{GS} = 0 V V_{DS} = 80 percent of rated V_{DS}	Max $r_{DS(on)1}$ 1/ V_{GS} = 12 V; $I_D = I_{D2}$ T_J = +25°C
	V dc	V dc		μA dc	ohms
		Min	Max		
2N7380	100	2.0	4.0	25	0.18
2N7381	200	2.0	4.0	25	0.40

1/ Pulsed (see 4.5.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

MILITARY

MIL-S-19500 - Semiconductor Devices, General Specification for.

STANDARD

MILITARY

MIL-STD-750 - Test Methods for Semiconductor Devices.

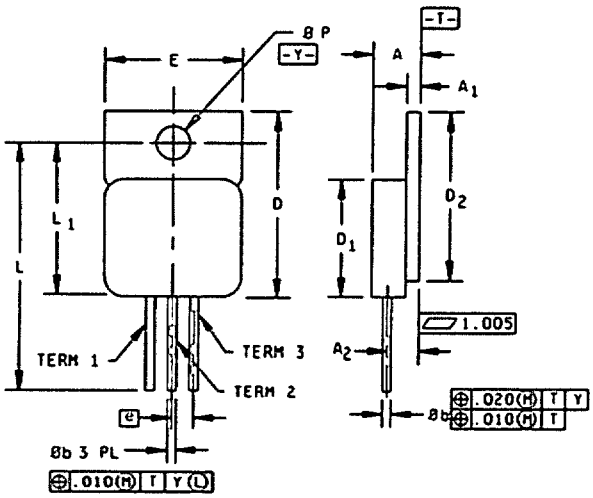
(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Associated detail specification. The individual item requirements shall be in accordance with MIL-S-19500 and as specified herein.

3.2 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as defined in MIL-S-19500.



Ltr	Dimensions			
	Millimeters		Inches	
	Min	Max	Min	Max
A	4.83	5.08	.190	.200
A_1	0.89	1.14	.035	.045
A_2	3.05 BSC		.120 BSC	
D	16.38	16.89	.645	.665
D_1	10.41	10.92	.410	.430
D2	15.06	15.42	.593	.607
e	2.54 BSC		.100 BSC	
E	10.41	10.67	.410	.420
L	26.21	28.75	1.032	1.132
L_1	13.39	13.64	.527	.537
ØP	3.56	3.81	.140	.150
Øb	0.64	0.89	.025	.035
Term 1	Drain			
Term 2	Source			
Term 3	Gate			

NOTES:
1. Dimensions are in millimeters.
2. Equivalents are given for general information only.
3. All terminals are isolated from case.
4. The preferred measurements used herein are the metric units. However, this transistor was designed using inch-pound units of measurement. In case of conflicts between the metric and inch-pound units, the inch-pound units shall be the rule.

FIGURE 1. Dimensions and configuration (TO-257AA).

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-S-19500, and on figure 1 herein. Methods used for electrical isolation of the terminal feedthroughs shall employ materials that contain a minimum of 90 percent AL_2O_3 (ceramic). Examples of such construction techniques are metallized ceramic eyelets or ceramic walled packages. The preferred measurements used herein are the metric units. However, this transistor was designed using inch-pound units of measurement. In case of conflicts between the metric and inch-pound units, the inch-pound units shall be the rule.

3.3.1 Lead finish. Lead finish shall be solderable in accordance with MIL-S-19500, MIL-STD-750, and herein. Where a choice of lead finish or formation is desired, it shall be specified in the acquisition document (see 6.2). When lead formation is performed, as a minimum, the vendor shall perform 100 percent hermetic seal in accordance with screen 14 of MIL-S-19500 and 100 percent group A2 electrical measurements.

3.3.2 Internal construction. Multiple chip construction shall not be permitted.

3.4 Marking. Marking shall be in accordance with MIL-S-19500.

3.5 Electrostatic discharge protection. The devices covered by this specification require electrostatic protection.

3.5.1 Handling. MOS devices must be handled with certain precautions to avoid damage due to the accumulation of static charge. The following handling procedures shall be followed:

a. Devices shall be handled on benches with conductive handling devices.

b. Ground test equipment, tools, and personnel handling devices.

c. Do not handle devices by the leads.

d. Store devices in conductive foam or carriers.

e. Avoid use of plastic, rubber, or silk in MOS areas.

f. Maintain relative humidity above 50 percent, if practical.

g. Care shall be exercised, during test and troubleshooting, to apply not more than maximum rated voltage to any lead.

h. Gate must be terminated to source. $R \leq 100$ k, whenever bias voltage is to be applied drain to source.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection shall be in accordance with MIL-S-19500, and as specified herein.

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-S-19500.

4.2.1 Group E inspection. Group E inspection shall be in accordance with table II herein.

4.3 Screening (JANS and JANTXV levels only). Screening shall be in accordance with table II of MIL-S-19500, and as specified herein. The following measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

Screen (see table II of MIL-S-19500)	Measurement	
	JANS levels	JANTXV levels
1/	Thermal response (see 4.5.3)	Thermal response (see 4.5.3)
1/ 2/	Method 3470 (see 4.5.5)	Method 3470 (see 4.5.5)
1/ 2/	Gate stress test (see 4.5.4)	Gate stress test (see 4.5.4)
9 1/	I_{GSS1}, I_{DSS1}, subgroup 2 of table I herein	Subgroup 2 of table I herein
10	Method 1042, test condition B	Method 1042, test condition B
11	I_{GSS1}, I_{DSS1}, $r_{DS(on)1}$, $V_{GS(th)1}$ Subgroup 2 of table I herein. ΔI_{GSS1} = ±20 nA dc or ±100 percent of initial value, whichever is greater. ΔI_{DSS1} = ±25 µA dc or ±100 percent of initial value, whichever is greater.	I_{GSS1}, I_{DSS1}, $r_{DS(on)1}$, $V_{GS(th)1}$ Subgroup 2 of table I herein.
12	Method 1042, test condition A, t = 240 hours	Method 1042, test condition A
13	Subgroup 2 and 3 of table I herein. ΔI_{GSS1} = ±20 nA dc or ±100 percent of initial value, whichever is greater. ΔI_{DSS1} = ±25 µA dc or ±100 percent of initial value, whichever is greater. $\Delta r_{DS(on)1}$ = ±20 percent of initial value. $\Delta V_{GS(th)1}$ = ±20 percent of initial value.	Subgroup 2 of table I herein. ΔI_{GSS1} = ±20 nA dc or ±100 percent of initial value, whichever is greater. ΔI_{DSS1} = ±25 µA dc or ±100 percent of initial value, whichever is greater. $\Delta r_{DS(on)1}$ = ±20 percent of initial value. $\Delta V_{GS(th)1}$ = ±20 percent of initial value.

1/ Shall be performed anytime before screen 10.
2/ This is a stress test designed to ensure a rugged product.

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-S-19500.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-S-19500 and table I herein. Electrical measurements (end points) and delta requirements shall be in accordance with the applicable steps of table III herein.

4.4.2 Group B inspection (JANTX and JANTXV). Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table IVa (JANS) and table IVb (JANTX and JANTXV) of MIL-S-19500, and as follows. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, group A, subgroup 2 herein.

4.4.2.1 Group B inspection, table IVa (JANS) of MIL-S-19500.

Subgroup	Method	Condition
3	1051	Condition G
4	1042	Condition D, the heating cycle shall be 1 minute minimum, 2,000 cycles. No heat sink nor forced air cooling on the device shall be permitted.
5	1042	Condition A; V_{DS} = 80 percent of rated T_A = +175°C, t = 120 hours; read and record $V_{BR(DSS)}$ (pre and post) at I_D = 1 mA; read and record I_{DSS} (pre and post), in accordance with table I, group A, subgroup 2.
5	1042	Condition B; V_{GS} = 80 percent of rated T_A = +175°C, t = 24.
6	3161	See 4.5.3.

4.4.2.2 Group B inspection, table IVb (JANTX and JANTXV) of MIL-S-19500.

Subgroup	Method	Condition
2	1051	Condition G
3	1042	Test condition D, 2,000 cycles. The heating cycle shall be 1 minute minimum.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table V of MIL-S-19500, and as follows. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, group A, subgroup 2 herein.

4.4.3.1 Group C inspection, table V of MIL-S-19500.

Subgroup	Method	Condition
2	2036	Test condition A, weight = 10 lbs, t = 10 seconds.
6	1042	Test condition D, 6,000 cycles. The heating cycle shall be 1 minute minimum.

4.5 Methods of inspection. Methods of inspection shall be as specified in appropriate tables and as follows.

4.5.1 Pulse measurements. Conditions for pulse measurements shall be as specified in section 4 of MIL-STD-750.

4.5.2 Thermal resistance. Thermal resistance measurements shall be performed in accordance with method 3161 of MIL-STD-750. The maximum limit of $R_{\Theta JC(max)}$ shall be 2.5°C/W. The following parameter measurements shall apply:

a. Measuring current (I_H): 10 mA.

b. Drain heating current (I_H): 1.5 A minimum.

c. Heating time (t_H): Steady state (see MIL-STD-750, method 3161 for definition).

d. Drain-source heating voltage (V_H): 20 V minimum.

e. Measurement time delay (t_{MD}): 30 µs to 60 µs maximum.

f. Sample window time (t_{SW}): 10 µs maximum.

4.5.3 Thermal impedance ($Z_{\Theta JC}$ measurements). The $Z_{\Theta JC}$ measurements shall be performed in accordance with MIL-STD-750, method 3161. The maximum limit (not to exceed figure 2, thermal impedance curves and the group A, subgroup 2 limits) for $Z_{\Theta JC}$ in screening (table II of MIL-S-19500) shall be derived by each vendor by means of statistical process control. When the process has exhibited control and capability, the capability data shall be used to establish the fixed screening limit. In addition to screening, once a fixed limit has been established, monitor all future sealing lots using a random five piece sample from each lot to be plotted on the applicable X, R chart. If a lot exhibits an out of control condition, the entire lot shall be removed from the line and held for engineering evaluation and disposition. This procedure may be used in lieu of an in line process monitor.

a. Measuring current (I_M): 10 mA.

b. Drain heating current (I_H): 1.5 A minimum.

c. Heating time (t_H): 100 ms.

d. Drain-source heating voltage (V_H): 20 V minimum.

e. Measurement time delay (t_{MD}): 30 µs to 60 µs maximum.

f. Sample window time (t_{SW}): 10 µs maximum.

4.5.4 Gate stress test.

a. V_{GS} = ±24 V minimum.

b. t = 250 µs minimum.

4.5.5 Single pulse avalanche energy (E_{AS}).

a. Peak current (I_{AS}): I_{D1}.

b. Peak gate voltage (V_{GS}): 10 V.

c. Gate to source resistor (R_{GS}): $25 \leq R_{GS} \leq 200\ \Omega$.

d. Initial case temperature: +25°C +10°C, -5°C.

e. Inductance: $(2\ E_{AS}/(I_{D1})^2))((V_{BR} - V_{DD})/V_{BR})$ mH minimum.

f. Number of pulses to be applied: 1 pulse minimum.

g. Supply voltage V_{DD} = 50 V, or 25 V for 100 V devices.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical inspection	2071					
Subgroup 2						
Thermal impedance	3161	See 4.5.3	$Z_{\Theta JC}$		2.5	°C/W
Breakdown voltage, drain to source	3407	V_{GS} = 0 V dc, I_D = 1.0 mA, bias condition C	$V_{(BR)DSS}$			
2N7380				100		V dc
2N7381				200		V dc
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, I_D = 0.25 mA	$V_{GS(th)1}$	2.0	4.0	V dc
Gate current	3411	V_{GS} = ±20 V dc, V_{DS} = 0 V dc, bias condition C	I_{GSS1}		±100	nA dc
Drain current	3413	V_{GS} = 0 V dc, V_{DS} = 80 percent of rated V_{DS}, bias condition C	I_{DSS1}		25	µA dc
Static drain to source on-state resistance	3421	V_{GS} = 12 V dc, condition A, pulsed (see 4.5.1), I_D = rated I_{D2} (see 1.3)	$r_{DS(on)1}$			
2N7380					0.18	Ω
2N7381					0.40	Ω
Static drain to source on-state resistance	3421	V_{GS} = 12 V dc, condition A, pulsed (see 4.5.1), I_D = rated I_{D1} (see 1.3)	$r_{DS(on)2}$			
2N7380					0.20	Ω
2N7381					0.49	Ω
Forward voltage (source drain diode)	4011	V_{GS} = 0 V dc, I_D = rated I_{D1} pulsed (see 4.5.1)	V_{SD}			
2N7380					1.8	V
2N7381					1.4	V

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 3						
High temperature operation:		T_A = +125°C				
Gate current	3411	Bias condition C, V_{GS} = ±20 V dc, V_{DS} = 0 V dc	I_{GSS2}		±200	nA dc
Drain current	3413	Bias condition C, V_{GS} = 0 V dc, V_{DS} = 80 percent of rated V_{DS}	I_{DSS3}		0.25	mA dc
Static drain to source on-state	3421	V_{GS} = 12 V dc, pulsed (see 4.5.1), I_D = rated I_{D2}	$r_{DS(on)3}$			
2N7380					0.35	Ω
2N7381					0.75	Ω
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, I_D = 0.25 mA dc	$V_{GS(th)2}$	1.0		V dc
Low temperature operation:		T_A = -55°C				
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, I_D = 0.25 mA dc	$V_{GS(th)3}$		5.0	V dc
Subgroup 4						
Switching time test	3472	I_D = rated I_{D1}, V_{GS} = 12 V dc, gate drive impedance = 7.5Ω, V_{DD} = 50 percent of $V_{BR(DSS)}$				
Turn-on delay time			$t_{d(on)}$			
2N7380					35	ns
2N7381					35	ns
Rise time			t_r			
2N7380					75	ns
2N7381					75	ns
Turn-off delay time			$t_{d(off)}$			
2N7380					70	ns
2N7381					70	ns
Fall time			t_f			
2N7380					60	ns
2N7381					60	ns

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 5						
Safe operating area test (high voltage)	3474	See figure 3, t_p = 10 ms, V_{DS} = 80 percent of rated $V_{BR(DSS)}$, V_{DS} = 200 V maximum				
Electrical measurements		See table I, group A, subgroup 2				
Subgroup 6						
Not applicable						
Subgroup 7						
Gate charge	3471	Condition B				
On-state gate charge			$Q_{g(on)}$			
2N7380					42	nC
2N7381					43	nC
Gate to source charge			Q_{gs}			
2N7380					10.0	nC
2N7381					10.0	nC
Gate to drain charge			Q_{gd}			
2N7380					20	nC
2N7381					20	nC
Reverse recovery time	3473	$d_i/d_t \leq 100$ A/µs, $V_{DD} \leq 50$ V, $I_D = I_{D1}$	t_{rr}			
2N7380					300	ns
2N7381					500	ns

1/ For sampling plan, see MIL-S-19500.

2/ This test is required for the following endpoint measurements only:

JANS - group B, subgroup 3 and 4

JANTX and JANTXV - group B, subgroup 2 and 3;
group C, subgroup 6;
group E, subgroup 1

TABLE II. Group D inspection.

Inspection 1/ 2/ 3/	MIL-STD-750 Method	MIL-STD-750 Conditions	Symbol	Pre-irradiation limits M, D, and R Min	Pre-irradiation limits M, D, and R Max	Pre-irradiation limits F, G, and H 4/ Min	Pre-irradiation limits F, G, and H 4/ Max	Post-irradiation limits M, D, and R Min	Post-irradiation limits M, D, and R Max	Post-irradiation limits F, G, and H 4/ Min	Post-irradiation limits F, G, and H 4/ Max	Unit
Subgroup 2		T_C = +25°C										
Steady-state total dose irradiation (V_{GS} bias) 5/	1019	V_{GS} = 12 V V_{DS} = 0 V										
Steady-state total dose irradiation (V_{DS} bias) 5/	1019	V_{GS} = 0 V, V_{DS} = 80 percent of rated V_{DS} (pre-irradiation)										
End-point electrical												
Breakdown voltage, drain to source	3407	V_{GS} = 0 V, I_D = 1 mA bias condition C	V_{BRDSS}									
2N7380				100		100		100		100		V dc
2N7381				200		200		200		200		V dc
Gate to source voltage 4/ (threshold)	3403	$V_{DS} \geq V_{GS}$ I_D = 1 mA	V_{GSth}									
2N7380				2.0	4.0	2.0	4.0	2.0	4.0	1.25	4.5	V dc
2N7381				2.0	4.0	2.0	4.0	2.0	4.0	1.25	4.5	V dc
Gate current	3411	V_{GS} = 20 V V_{DS} = 0 V, bias condition C	I_{GSSF1}		100		100		100		100	nA dc
Gate current	3411	V_{GS} = -20 V V_{DS} = 0 V, bias condition C	I_{GSSR1}		-100		-100		-100		-100	nA dc

See footnotes at end of table.

TABLE II. Group D inspection - Continued.

Inspection 1/ 2/ 3/	MIL-STD-750 Method	MIL-STD-750 Conditions	Symbol	Pre-irradiation limits M, D, and R Min	Pre-irradiation limits M, D, and R Max	Pre-irradiation limits F, G, and H 4/ Min	Pre-irradiation limits F, G, and H 4/ Max	Post-irradiation limits M, D, and R Min	Post-irradiation limits M, D, and R Max	Post-irradiation limits F, G, and H 4/ Min	Post-irradiation limits F, G, and H 4/ Max	Unit
Subgroup 2 - Continued												
Drain current	3413	V_{GS} = 0 V Bias condition C V_{DS} = 80 percent of rated V_{DS} (pre-irradiation)	I_{DSS}									
2N7380					25		25		25		50	µA dc
2N7381					25		25		25		50	µA dc
Static drain to source on-state resistance	3421	V_{GS} = 12 V, Condition A pulsed, see 4.5.1. $I_D = I_{D2}$	r_{DSON1}									
2N7380					0.18		0.18		0.18		0.24	ohm
2N7381					0.40		0.40		0.40		0.53	ohm
Forward voltage source drain diode	4011	V_{GS} = 0 V, $I_D = I_{D1}$, bias condition C	V_{SD}									
2N7380					1.8		1.8		1.8		1.8	V
2N7381					1.4		1.4		1.4		1.4	V

1/ For sampling plan, see MIL-S-19500.
2/ Separate samples shall be pulled for each bias.
3/ Group D qualification may be performed anytime prior to lot formation. Wafers qualified to these group D QCI requirements may be used for any other detail specification utilizing the same die design.
4/ The F designation represents devices which pass endpoints at both 100K and 300K rads (Si). The G designation represents devices which pass 100K, 300K and 600K rad (Si) endpoints.
5/ H must meet end points for 300K and 1,000K rad (Si).

TABLE III. Group E inspection (all quality levels) for qualification only.

Inspection	MIL-STD-750		Qualification inspection
	Method	Conditions	
Subgroup 1			22 devices, c = 0
Temperature cycling	1051	Test condition G, 500 cycles	
Hermetic seal	1071		
Fine leak Gross leak			
Electrical measurements		See table I, group A, subgroup 2	
Subgroup 2 1/			22 devices, c = 0
Steady-state reverse bias	1042	Condition A, 1,000 hours	
Electrical measurements		See table I, group A, subgroup 2	
Steady-state gate bias	1042	Condition B, 1,000 hours	
Electrical measurements		See table I, group A, subgroup 2	
Subgroup 3			
Not applicable			
Subgroup 4			5 devices, c = 0
Thermal resistance	3161	See 4.5.2	
Subgroup 5			
Not applicable			

1/ A separate sample for each test may be pulled.

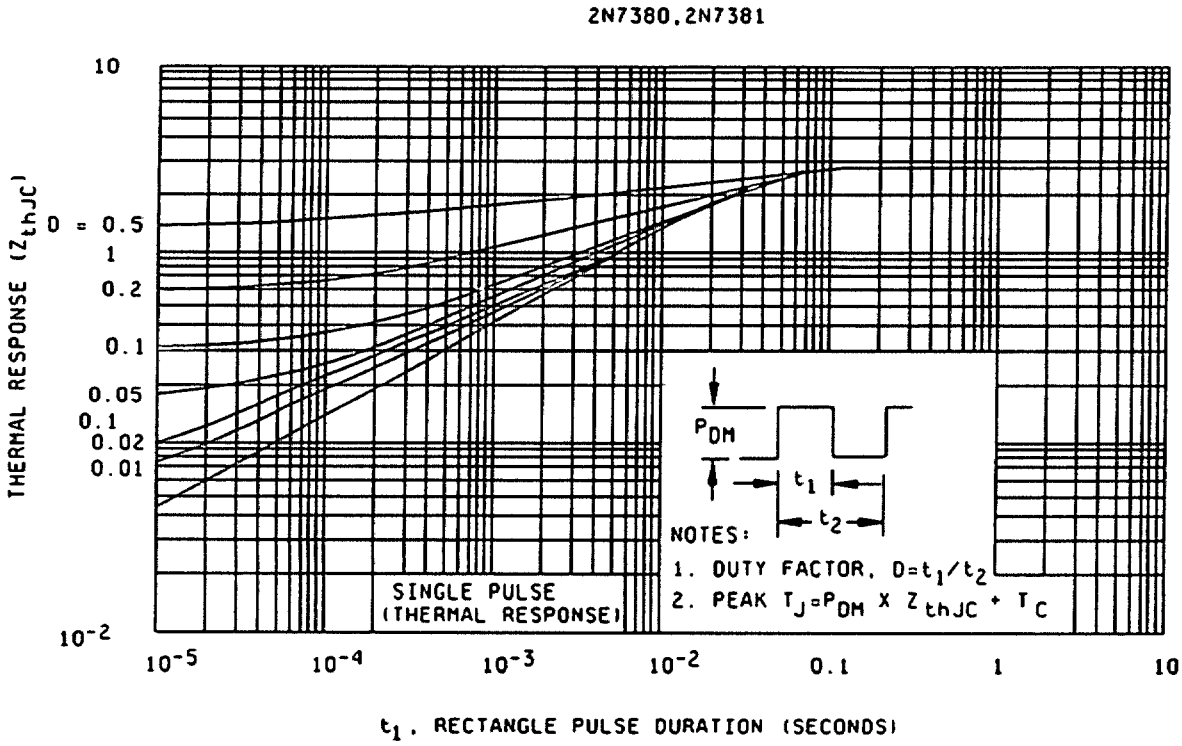


FIGURE 2. Thermal response curves.

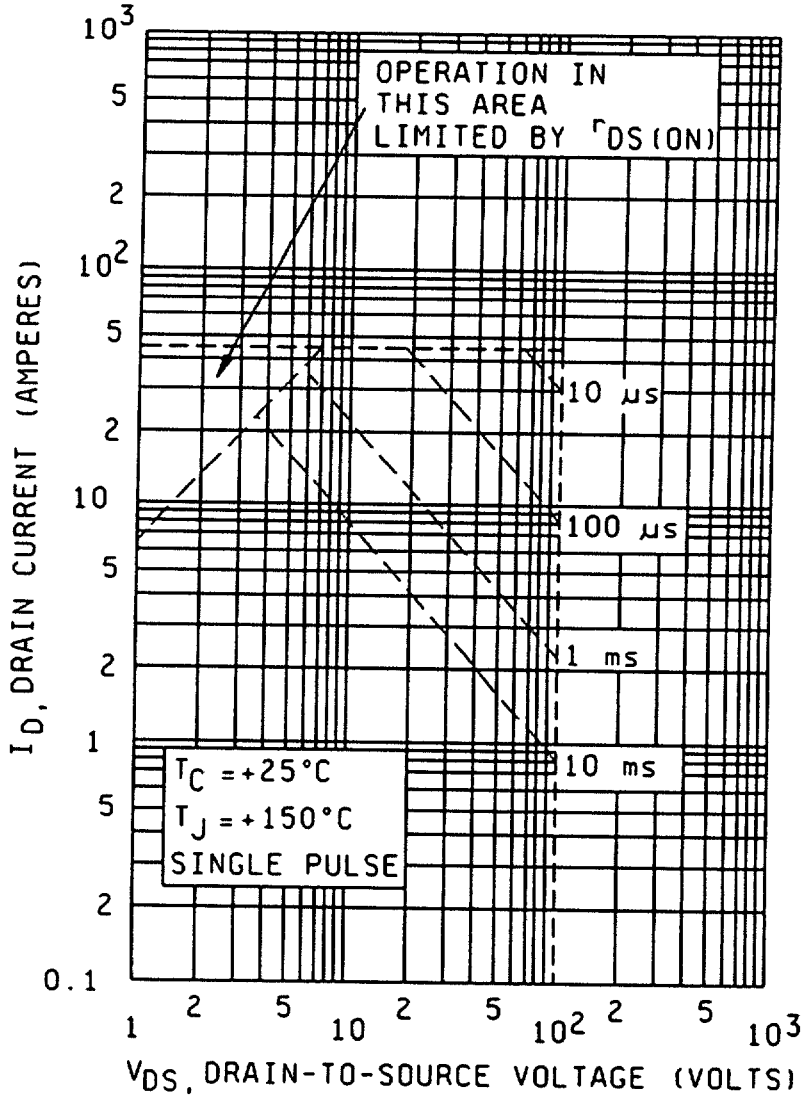


FIGURE 3. Safe operating area graphs.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-S-19500.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Notes. The notes specified in MIL-S-19500 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Issue of DODISS to be cited in the solicitation.

b. Lead formation and finish as specified (see 3.3.1).

c. Product assurance level and type designator.

6.3 Supersession data. This specification supersedes DESC drawing 89009, dated 19 December 1989.

CONCLUDING MATERIAL

Custodians:
Army - ER
Navy - EC
Air Force - 17
NASA - NA

Review activities:
Army - AR, MI, SM
Navy - AS, CG, MC, OS
Air Force - 13, 19, 85, 99

Preparing activity:
Navy - EC

Agent:
DLA - ES

(Project 5961-1589)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-S-19500/614	2. DOCUMENT DATE (YYMMDD) 10 January 1994

3. DOCUMENT TITLE
SEMICONDUCTOR DEVICE, FIELD EFFECT RADIATION HARDENED TRANSISTOR, N-CHANNEL, SILICON TYPES 2N27380 AND 2N7381, JANTXV, M, D, R, F, G, AND H, JANS M, D, R, F, G, AND H

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, first, Middle initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME Alan Barone	b. TELEPHONE (Include Area Code) (1) Commercial 513-296-6048	(2) AUTOVON 986-6048
c. ADDRESS (Include Zip Code) Defense Electronics Supply Center Attn: DESC-ELDT Dayton, Ohio 45444-5765	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	